

Details of collaborative activities for research, faculty exchange, student exchange, internship, on-the-job training, project work, etc. during the year 2022-23

Department of Botany



CERTIFICATE

This is to certify that Ms. Anna Mariya Lorange (Reg.No.22640004), M.Sc. Botany, Maharajas College, Ernakulam has successfully completed her internship work on 'TOOLS AND TECHNIQUES IN PLANT RESEARCH' at KSCSTE-Kerala Forest Research Institute, Peechi, under the supervision of Dr.V.B.Sreekumar, Principal Scientist, Botany Department, during the period from 02 to 15 May 2023.

Date: 30.05.2023

Supervising Guide

Dr. V. B. Sreekumar
Principal Scientist & Head
Forest Botany Department
KSCSTE - Kerala Forest Research Institute
Peechi - 680 653, Thrissur, Kerala

Academic Pgm.
Coordinator

Dr.V.Anitha
Senior Principal Scientist &
Academic Programme Coordinator
KSCSTE-Kerala Forest Research Institute
Peechi - 680 653, Thrissur, Kerala

Director

Dr. Syam Varghese





KSCSTE-Kerala Forest Research Institute

(An Institution under Kerala State Council for Science, Technology and Environment)
Peechi - 680 653, Thrissur, Kerala, India



CERTIFICATE

This is to certify that Ms.Anjana Prakash K (Reg.No.22640002), M.Sc. Botany, Maharajas College, Ernakulam has successfully completed her internship work on 'TOOLS AND TECHNIQUES IN PLANT RESEARCH' at KSCSTE-Kerala Forest Research Institute, Peechi, under the supervision of Dr.V.B.Sreekumar, Principal Scientist, Botany Department, during the period from 02 to 15 May 2023.

Date: 30.05.2023

Supervising Guide

Academic Pgm.
Coordinator

Director

Dr. V. B. Sreekumar
Principal Scientist & Head
Forest Botany Department
KSCSTE - Kerala Forest Research Institute
Peechi - 680 653, Thrissur, Kerala

Dr.V.Anitha
Senior Principal Scientist &
Academic Programme Coordinator
KSCSTE-Kerala Forest Research Institute
Peechi - 680 653, Thrissur, Kerala

Dr. Syam Visweshath
Director
KSCSTE - Kerala Forest Research Institute
Peechi - 680 653, Thrissur, Kerala





CERTIFICATE

This is to certify that Ms.Rimsha (Reg.No.22640011), M.Sc. Botany, Maharajas College, Ernakulam has successfully completed her internship work on 'TOOLS AND TECHNIQUES IN PLANT RESEARCH' at KSCSTE-Kerala Forest Research Institute, Peechi, under the supervision of Dr.V.B.Sreekumar, Principal Scientist, Botany Department, during the period from 02 to 15 May 2023.

Date: 30.05.2023

Supervising Guide

Dr. V. B. Sreekumar
Principal Scientist & Head
Forest Botany Department

KSCSTE - Kerala Forest Research Institute
Peechi - 680 653, Thrissur, Kerala

Academic Pgm.
Coordinator

Dr.V.Anitha
Senior Principal Scientist &
Academic Programme Coordinator
KSCSTE - Kerala Forest Research Institute
Peechi - 680 653 Thrissur, Kerala

Director

Dr. Syam Vigneshan
Director

KSCSTE - Kerala Forest Research Institute
Peechi - 680 653, Thrissur, Kerala

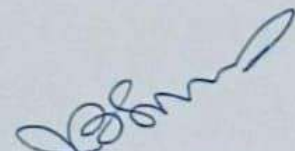




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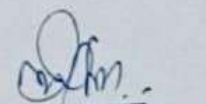
This is to certify that Ms. Anjitha V L (Reg.No.22640003), M.Sc. Botany, Maharajas College, Ernakulam has successfully completed her internship work on 'TOOLS AND TECHNIQUES IN PLANT RESEARCH' at KSCSTE-Kerala Forest Research Institute, Peechi, under the supervision of Dr.V.B.Sreekumar, Principal Scientist, Botany Department, during the period from 02 to 15 May 2023.

Date: 30.05.2023



Supervising Guide

Dr. V. B. Sreekumar
Principal Scientist & Head
Forest Botany Department
KSCSTE - Kerala Forest Research Institute
Peechi - 680 653, Thrissur, Kerala



Academic Pgm.
Coordinator

Dr. V. Anitha
Senior Principal Scientist &
Academic Programme Coordinator
KSCSTE-Kerala Forest Research Institute
Peechi - 680 653, Thrissur, Kerala



Director


Dr. Syam Viswanath
Director
KSCSTE - Kerala Forest Research Institute
Peechi - 680 653, Thrissur, Kerala



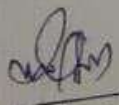


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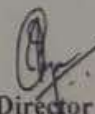
This is to certify that Mr. Swarag P R (Reg.No.22640012), M.Sc. Botany, Maharajas College, Ernakulam has successfully completed his internship work on 'TOOLS AND TECHNIQUES IN PLANT RESEARCH' at KSCSTE-Kerala Forest Research Institute, Peechi, under the supervision of Dr.V.B.Sreekumar, Principal Scientist, Botany Department, during the period from 02 to 15 May 2023.

Date: 30.05.2023  Supervising Guide

Dr. V. B. Sreekumar
Principal Scientist & Head
Forest Botany Department
KSCSTE - Kerala Forest Research Institute
Peechi - 680 653, Thrissur, Kerala


Academic Pgm.
Coordinator

Dr.V.Anitha
Senior Principal Scientist &
Academic Programme Coordinator
KSCSTE-Kerala Forest Research Institute
Peechi - 680 653, Thrissur, Kerala


Director

Dr. Syam Viswanath
Director
KSCSTE - Kerala Forest Research Institute
Peechi - 680 653, Thrissur, Kerala





KSCSTE-Kerala Forest Research Institute


(An Institution under Kerala State Council for Science, Technology and Environment)
Peechi - 680 653, Thrissur, Kerala, India



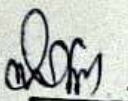
CERTIFICATE

This is to certify that Ms. Anusree P V (Reg.No.22640005), M.Sc. Botany, Maharajas College, Ernakulam has successfully completed her internship work on 'TOOLS AND TECHNIQUES IN PLANT RESEARCH' at KSCSTE-Kerala Forest Research Institute, Peechi, under the supervision of Dr.V.B.Sreekumar, Principal Scientist, Botany Department, during the period from 02 to 15 May 2023.

Date: 30.05.2023


Supervising Guide

Dr. V. B. Sreekumar
Principal Scientist & Head
Forest Botany Department
KSCSTE - Kerala Forest Research Institute
Peechi - 680 653, Thrissur, Kerala


Academic Pgm.
Coordinator

Dr.V.Anitha
Senior Principal Scientist &
Academic Programme Coordinator
KSCSTE - Kerala Forest Research Institute
Peechi - 680 653, Thrissur, Kerala


Director

Dr. Gyan Viswanath
Director
KSCSTE - Kerala Forest Research Institute
Peechi - 680 653, Thrissur, Kerala





KSCSTE-Kerala Forest Research Institute

(An Institution under Kerala State Council for Science, Technology and Environment)

Peechi - 680 653, Thrissur, Kerala, India



CERTIFICATE

This is to certify that Ms. Keerthana V G (Reg.No.22640007), M.Sc. Botany, Maharajas College, Ernakulam has successfully completed her internship work on 'TOOLS AND TECHNIQUES IN PLANT RESEARCH' at KSCSTE-Kerala Forest Research Institute, Peechi, under the supervision of Dr.V.B.Sreekumar, Principal Scientist, Botany Department, during the period from 02 to 15 May 2023.

Date: 30.05.2023 Supervising Guide

Dr. V. B. Sreekumar

Principal Scientist & Head
Forest Botany Department

KSCSTE - Kerala Forest Research Institute
Peechi - 680 653, Thrissur, Kerala

Academic Pgm.
Coordinator

Dr. V. Anitha

Senior Principal Scientist &
Academic Programme Coordinator

KSCSTE-Kerala Forest Research Institute
Peechi - 680 653, Thrissur, Kerala

Director





KSCSTE-Kerala Forest Research Institute

(An Institution under Kerala State Council for Science, Technology and Environment)

Peechi - 680 653, Thrissur, Kerala, India



CERTIFICATE

This is to certify that Ms. Muhsina T I (Reg.No.22640009), M.Sc. Botany, Maharajas College, Ernakulam has successfully completed her internship work on 'TOOLS AND TECHNIQUES IN PLANT RESEARCH' at KSCSTE-Kerala Forest Research Institute, Peechi, under the supervision of Dr.V.B.Sreekumar, Principal Scientist, Botany Department, during the period from 02 to 15 May 2023.

Date: 30.05.2023

Supervising Guide

Academic Pgm.
Coordinator

Director

Dr. V. B. Sreekumar
Principal Scientist & Head
Forest Botany Department
KSCSTE - Kerala Forest Research Institute
Peechi - 680 653, Thrissur, Kerala

Dr.V.Anitha
Senior Principal Scientist &
Academic Programme Coordinator
KSCSTE-Kerala Forest Research Institute
Peechi - 680 653, Thrissur, Kerala

Dr. Syam Vasantha
Director
KSCSTE - Kerala Forest Research Institute
Peechi - 680 653, Thrissur, Kerala





CERTIFICATE

This is to certify that Ms.Nishana A P(Reg.No.22640010), M.Sc. Botany, Maharajas College, Ernakulam has successfully completed her internship work on 'TOOLS AND TECHNIQUES IN PLANT RESEARCH' at KSCSTE-Kerala Forest Research Institute, Peechi, under the supervision of Dr.V.B.Sreekumar, Principal Scientist, Botany Department, during the period from 02 to 15 May 2023.

Date: 30.05.2023

Supervising Guide

Dr. V. B. Sreekumar
Principal Scientist & Head
Forest Botany Department
KSCSTE - Kerala Forest Research Institute
Peechi - 680 653, Thrissur, Kerala

Academic Pgm.
Coordinator

Dr.V.Anitha
Senior Principal Scientist &
Academic Programme Coordinator
KSCSTE-Kerala Forest Research Institute
Peechi - 680 653, Thrissur, Kerala

Director

Dr. V. B. Sreekumar
Principal Scientist &
Forest Botany Department
KSCSTE - Kerala Forest Research Institute
Peechi - 680 653, Thrissur, Kerala





CERTIFICATE

This is to certify that Mr. Muhammed Suhail N A (Reg.No.22640008), M.Sc. Botany, Maharajas College, Ernakulam has successfully completed his internship work on 'TOOLS AND TECHNIQUES IN PLANT RESEARCH' at KSCSTE-Kerala Forest Research Institute, Peechi, under the supervision of Dr.V.B.Sreekumar, Principal Scientist, Botany Department, during the period from 02 to 15 May 2023.

Date: 30.05.2023

Supervising Guide

Dr. V. B. Sreekumar
Principal Scientist & Head
Forest Botany Department
KSCSTE - Kerala Forest Research Institute
Peechi - 680 653, Thrissur, Kerala

Academic Pgm.
Coordinator

Dr.V.Anitha
Senior Principal Scientist &
Academic Programme Coordinator
KSCSTE-Kerala Forest Research Institute
Peechi - 680 653, Thrissur, Kerala

Director

Dr. Syam V. S. S. S.
Director
KSCSTE - Kerala Forest Research Institute
Peechi - 680 653, Thrissur, Kerala



ST. Albert's College (AUTONOMOUS), ERNAKULAM
DEPARTMENT OF BOTANY

CERTIFICATE

This is to certify that Ms Gloriamol Mathew (Admission number 7973) is a second-year M.Sc. Botany student at Maharajas College, Ernakulam. She completed her research work under the ASPIRE fellowship scheme at the Department of Botany, St. Albert's College (Autonomous), Ernakulam from March 25rd to May 9th 2023. Her attendance at St. Albert's College during this period is above 90%.

Date: 10/5/2023

Anisha



[Signature]
PRINCIPAL
PRINCIPAL IN CHARGE
ST ALBERT'S COLLEGE
(AUTONOMOUS)
ERNAKULAM - 682018

Dr. Anisha S, MSc PhD
Assistant Professor &
Research Guide (PEN No.770799)
Department of Botany
St. Albert's College (Autonomous)
Ernakulam, KERALA-682018.

PROJECT COMPLETION CERTIFICATE (FOR ASPIRE SCHOLARSHIP - 2022-23)

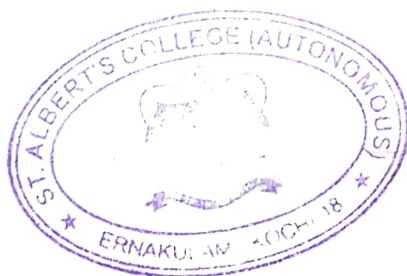
This is to certify that Sri/Smt..... GLORIAMOL MATHEW..... PG.....student of..... MAHARAJAS COLLEGE, ERNAKULAM.....affiliated to....St.Albert's College, Ernakulam.....has successfully completed his/her Aspire Scholarship Project/Internship entitled *Isolation and characterization of endophytic bacteria from Andropogonis paniculata leaves* within the stipulated month(s) from *March*..... to *May*..... under the guidance of Prof/Dr..... *Anisha S*.....of our (St.Albert's College, Ernakulam) institution

Signature

Dr. BIJOY V M
Principal in Charge
ST. ALBERT'S COLLEGE
(AUTONOMOUS)
ERNAKULAM, KOCHI-18

Name & Designation

(Head of the Host Institution)



(Office Seal)

Dr. Anisha S, MSc PhD
Assistant Professor &
Research Guide (PEN No 770799)
Department of Botany
St. Albert's College (Autonomous)
Ernakulam, KERALA-682018.

Name & Designation

(Guide of Host Institution)



(Principal/HOD/Institution)

SPECIAL GRADE PRINCIPAL
MAHARAJA'S COLLEGE
ERNAKULAM

Encl:1) Project Report

2) Attendance certificate from parent institution(as per notification dated.....)

Appendix-II

PROJECT COMPLETION CERTIFICATE
(FOR ASPIRE SCHOLARSHIP - 2022-23)

This is to certify that Sri/Smt..... VIDYA PRAKASAN..... PG.....student of..... MAHARAJAS COLLEGE,
ERNAKULAM.....affiliated to..... Government College for Women Vazhuthacaud.....has successfully completed his/her
Aspire Scholarship Project/Internship entitled *Assessing the efficacy of herbal hair dye for selected people* within
the stipulated month(s) from *22.3.2023* to *5.5.2023* under the guidance of Prof/Dr. *Manoj Kumar A.* of
our (Government College for Women Vazhuthacaud) institution

Signature

Name & Designation

(Head of the Host Institution)



Manoj Kumar A.
Name & Designation
(Guide of Host Institution)
DR. MANOJ KUMAR A.
ASSISTANT PROFESSOR
GOVERNMENT COLLEGE FOR WOMEN
THIRUVANANTHAPURAM
PER ASSISTANT is 94036
email: manojkgmail.

(Principal/HOD/Institution)

PRINCIPAL
GOVT. COLLEGE FOR WOMEN
THIRUVANANTHAPURAM

Encl: 1) Project Report

2) Attendance certificate from parent institution (as per notification dated.....)

08/05/2023

ATTENDANCE STATEMENT

This is to certify that Ms. Vidya Prakasan (2nd MSc Botany) is a bonafide PG student of Department of Botany, Maharajas College, Ernakulam, has successfully completed her Aspire Scholarship Project within the stipulated month(s) from 22/03/2023 to 05/05/2023 under the guidance of Prof/Dr. Manoj Kumar A. of Govt. College for Women, Thiruvananthapuram, with an attendance percentage of 100.

Manoj Kumar A
Tutor in charge

I. MANOJ KUMAR A
Assistant Professor of Botany
Government College for Women
Thiruvananthapuram - 695014
PEN 398676, Phone: 9495562197
email: manojtbgri@gmail.com



Head of the Department

HOD OF BOTANY
GOVT. COLLEGE FOR WOMEN
THIRUVANANTHAPURAM-14



**PROJECT COMPLETION CERTIFICATE
(FOR ASPIRE SCHOLARSHIP - 2022-23)**

This is to certify that Sri/Smt Muhsina Mohamed PG student of MAHARAJAS COLLEGE, ERNAKULAM affiliated to Cochin University of Science and Technology has successfully completed his/her Aspire Scholarship Project/Internship entitled "Effects of Aquaporin inhibition on the developmental stages of Drosophila" the stipulated month(s) from March to May the guidance of Dr. Bhavya Balan Chandrika of our(Cochin University of Science and Technology) institution.

Signature

Name & Designation

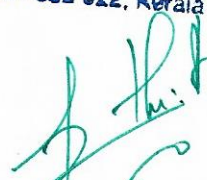
(Head of the Host Institution)



Name & Designation

Dr. BHAVYA BALAN CHANDRIKA
(Guide of Host Institution)
Assistant Professor
Department of Biotechnology
Cochin University of
Science and Technology
Kochi - 682 022, Kerala

(Office Seal)

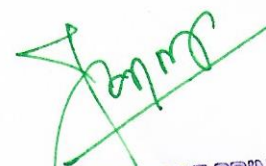
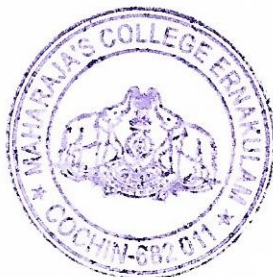


(Principal/HOD/Institution)

Professor & Head
Department of Biotechnology
Cochin University of Science & Technology
Kochi - 682 022, Kerala
Tel: 0484-2576267

Encl:1) Project Report

2) Attendance certificate from parent institution(as per notification dated.....)



SPECIAL GRADE PRINCIPAL
MAHARAJA'S COLLEGE
ERNAKULAM

Appendix-II

PROJECT COMPLETION CERTIFICATE
(FOR ASPIRE SCHOLARSHIP - 2022-23)

This is to certify that Sri/Smt..... SWETHA S MENON..... PG.....student of..... MAHARAJAS COLLEGE,
ERNAKULAM.....affiliated to.....St. Teresa s College, Kochi.has sucessfully completed his/her Aspire Scholarship
Project/Internship entitled *Morphological diversity and taxonomic significance of fruit and seeds of trees* within the stipulated
month(s) from *March* to *May* under the guidance of Prof/Dr. *Elsam Joseph* of our (St. Teresa
s College, Kochi) institution

Signature

Name & Designation

(Head of the Host Institution)

Wang

Name & Designation

(Guide of Host Institution)

Dr. Elsam Joseph

Associate Professor



Alphonsa

(Principal/HOD/Institution)

Dr. ALPHONSA VIJAYA JOSEPH
PRINCIPAL IN CHARGE
ST. TERESA'S COLLEGE
Autonomous
ERNAKULAM

Encl:1) Project Report

2) Attendance certificate from parent institution(as per notification dated.)

PROJECT COMPLETION CERTIFICATE
(FOR ASPIRE SCHOLARSHIP - 2022-23)

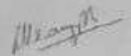
This is to certify that Sri/Smt.....Akhila K..... PG.....student of..... MAHARAJAS COLLEGE, ERNAKULAM.....affiliated to.....St. Teresa's College, Kochi. has successfully completed his/her Aspire Scholarship Project/Internship entitled Phytochemical analysis and antimicrobial activity of *Zingiber zerumbet* within the stipulated month(s) from.....March..... to.....May..... under the guidance of Prof/Dr. Elsam Joseph of our(St. Teresa's College, Kochi) institution



Signature

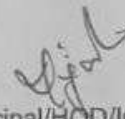
Name & Designation

(Head of the Host Institution)



Name & Designation
(Guide of Host Institution)

Dr. Elsam Joseph
Associate Professor



(Principal/HOD/Institution)

Dr. ALPHONSA VIJAYA JOSEPH
PRINCIPAL IN CHARGE
ST. TERESA'S COLLEGE
Autonomous
ERNAKULAM

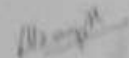
Encl:1) Project Report

2) Attendance certificate from parent institution(as per notification dated....)

ST. TERESA'S COLLEGE, ERNAKULAM
DEPARTMENT OF BOTANY

CERTIFICATE

This is to certify that Akhila K (Admission number 8776) is a second-year M.Sc. Botany student at Maharajas College, Ernakulam. She completed her research work under the ASPIRE fellowship scheme at the Department of Botany, St. Teresa's College, Ernakulam from March 23rd to May 9th 2023. Her attendance at St. Teresa's College during this period is above 90%.



Guide
Dr. Elsam Joseph
Associate Professor

Date:




Head of the Department: Dr. Liza Jacob
Associate Professor


Appendix-II

PROJECT COMPLETION CERTIFICATE
(FOR ASPIRE SCHOLARSHIP - 2022-23)


This is to certify that Sri/Smt..... ANAGHA K V..... PG.....student of..... MAHARAJAS COLLEGE,
ERNAKULAM.....affiliated to.....Kerala Agricultural University.....has successfully completed his/her Aspire Scholarship
Project/Internship entitled1 Title of the project: A STUDY ON GLYCAEMIC INDEX OF TWO SPECIES OF
HYLOCEREUS FRUITS within the stipulated month(s) from March to April under the guidance of Dr Veena Vighneswaran
,of our(Kerala Agricultural University) institution


Dr. Veena Vighneswaran
Asst. Professor (PB & C)
Rice Research Station
Vyttila, Kochin - 682 019
Signature
Name & Designation
(Head of the Host Institution)




Dr. Veena Vighneswaran
Asst. Professor (PB & C)
Rice Research Station
Vyttila, Kochin - 682 019
Name & Designation
(Guide of Host)




(Principal/HOD/Institution)
12/06/23
SPECIAL GRADE PRINCIPAL
MAHARAJA'S COLLEGE
ERNAKULAM

Encl:1) Project Report


2) Attendance certificate from parent institution(as per notification dated.....)

RICE RESEARCH STATION, VYTLA
Under Kerala Agricultural University ,Thrissur
DEPARTMENT OF PLANT BREEDING

CERTIFICATE

This is to certify that ANAGHA K V (Admission number 9162) is a second-year M.Sc. Botany student at Maharajas College, Ernakulam. She completed her research work under the ASPIRE fellowship scheme at the Department of Plant Breeding, RICE RESEARCH STATION, VYTLA, Under Kerala Agricultural University, Thrissur March 23rd to May 15th 2023. Her attendance at Rice Research Station during this period is above 90%.

Date:


HOD
Dr. Veena Vigneshwaran
Asst. Prof.
Rice Research Station
Vytila, Kochin-682 019

Appendix-II

**PROJECT COMPLETION CERTIFICATE
(FOR ASPIRE SCHOLARSHIP - 2022-23)**

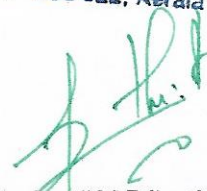
This is to certify that Sri/Smt Shifanoor PG student of MAHARAJAS COLLEGE, ERNAKULAM affiliated to Cochin University of Science and Technology has successfully completed his/her Aspire Scholarship Project/Internship entitled "EFFECTS OF AQUAPORIN CHANNEL INHIBITION ON DIFFERENT CELL LINES OF BREAST CANCER" within the stipulated month(s) from March to May under the guidance of Dr.Bhavya Balan Chandrika of our(Cochin University of Science and Technology) institution.

Name & Designation
(Head of the Host Institution)



Name & Designation
Dr. BHAVYA BALAN CHANDRIKA
(Guide of Host Institution)
Assistant Professor
Department of Biotechnology
Cochin University of
Science and Technology
Kochi - 682 022, Kerala

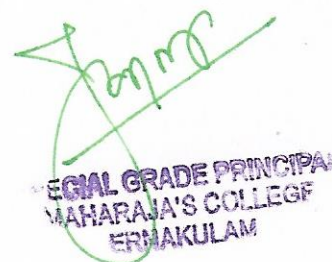
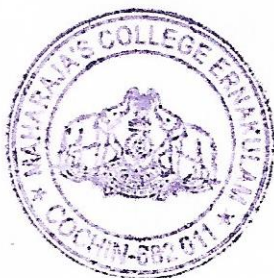
(Office Seal)



(Principal/HOD/Institution)
Professor & Head
Department of Biotechnology
Cochin University of Science & Technology
Kochi - 682 022, Kerala
Tel: 0484-2576267

Encl:1) Project Report

2)Attendance certificate from parent institution(as per notification dated.....)



REGAL GRADE PRINCIPAL
MAHARAJA'S COLLEGE
ERNAKULAM

Appendix-II

PROJECT COMPLETION CERTIFICATE
(FOR ASPIRE SCHOLARSHIP - 2022-23)

This is to certify that Sri/Smt SRUTHI M..... PG..... student of MAHARAJAS COLLEGE,
ERNAKULAM.....affiliated to..... St. Teresa s College, Kochi.....has successfully completed his/her Aspire Scholarship
Project/Internship entitled.... "Development of an insect repellent bio herbal formulation using selected species of ipomoea"
within the stipulated month(s) from.....March to.....May..... under the guidance of Prof/Dr Eisam
Joseph of our(St. Teresa s College, Kochi) institution

Signature

Name & Designation

(Head of the Host Institution)

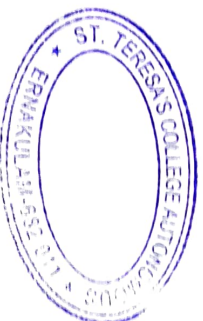
Name & Designation

(Guide of Host Institution) (Office Seal)

Dr. Eisam Joseph

Associate Professor

(Principal/HOD Institution)



Dr. ALPHONSA VILAYA JOSEPH
PRINCIPAL IN CHARGE
ST. TERESA'S COLLEGE

AUTONOMOUS
ERNAKULAM

End:1) Project Report

2) Attendance certificate from parent institution (as per notification dated.....)

**PROJECT COMPLETION CERTIFICATE
(FOR ASPIRE SCHOLARSHIP - 2022-23)**

This is to certify that Sri/Smt..... Moharban A T..... PG.....student of..... MAHARAJAS COLLEGE,
ERNAKULAM.....affiliated to.....St. Albert s College, Ernakulam.....has sucessfully completed his/her Aspire
Scholarship Project/Internship entitled The phytochemical study of *Besaya* *Scorpioides* within the
stipulated month(s) from March to May under the guidance of Prof/Dr. Dr. Anisha S.....of
our(St. Albert s College, Ernakulam) institution

Dr. BIJOY. V. M
PRINCIPAL IN CHARGE
ST. ALBERT'S COLLEGE
(AUTONOMOUS)
ERNAKULAM, KOCHI-19

Signature
Name & Designation
(Head of the Host Institution)

Dr. Anisha S, MSc PhD
Assistant Professor & Research Guide (PEN No. 770699)
Department of Botany
St. Albert's College (Autonomous)
Ernakulam, KERALA-682018.



(Principal/HOD/Institution)
SPECIAL GRADE PRINCIPAL
MAHARAJA'S COLLEGE
ERNAKULAM

- Encl:1) Project Report
2)Attendance certificate from parent institution(as per notification dated.....)



ST. ALBERT'S COLLEGE (AUTONOMOUS), ERNAKULAM
DEPARTMENT OF BOTANY

CERTIFICATE

This is to certify that Ms PRAVYA PRINSON (Admission number 8768) is a second-year M.Sc. Botany student at Maharajas College, (Autonomous) Ernakulam. She completed her research work under the ASPIRE fellowship scheme at the Department of Botany, St. Albert's College (Autonomous), Ernakulam from March 24rd to May 9th 2023. Her attendance at St. Albert's College during this period is above 90%.

Date: 10/5/2023



Dr. Anisha S, MSc PhD
Assistant Professor &
Research Guide (PEN No.770799)
Department of Botany
St. Albert's College (Autonomous)
Ernakulam, KERALA-682018.


PRINCIPAL IN CHARGE
ST ALBERT'S COLLEGE
(AUTONOMOUS)
ERNAKULAM, KOOCHI - 18

PROJECT COMPLETION CERTIFICATE
(FOR ASPIRE SCHOLARSHIP - 2022-23)

This is to certify that Sri/Smt..... PRAVYA PRINSON..... PG.....student of..... MAHARAJAS COLLEGE,
ERNAKULAM.....affiliated to.....St. Albert s College, Ernakulam.....has sucessfully completed his/her Aspire
Scholarship Project/Internship entitled *Isolation and Identification of micro organisms from the vegetable waste slurry*..... within the
stipulated month(s) from *March*..... to *May*..... under the guidance of Prof/Dr..... *ANISHA S*.....of
our(St. Albert s College, Ernakulam) institution





Signature
Name & Designation
(Head of the Host Institution)


Name & Designation
Dr. Anisha S, MSc PhD
Assistant Professor & Research Guide (PEN No.770799)
Department of Botany
St. Albert's College (Autonomous)
Ernakulam, KERALA-682018.
(Guide of Host Institution)

(Office Seal)




(Principal/HOD/Institution)
SPECIAL GRADE PRINCIPAL
MAHARAJA'S COLLEGE
ERNAKULAM

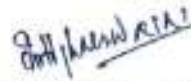
Encl:1) Project Report

2)Attendance certificate from parent institution(as per notification dated.....)

Appendix-II

**PROJECT COMPLETION CERTIFICATE
(FOR ASPIRE SCHOLARSHIP - 2022-23)**

This is to certify that Sri/Smt..... NAVEENA BEDSY ANAND..... PG.....student of..... MAHARAJAS COLLEGE, ERNAKULAM.....affiliated to.....Kerala Agricultural University.....has successfully completed his/her Aspire Scholarship Project/Internship entitled **An essay of drought tolerance in *Zamioculcas zamiifolia* : an ornamental aroid** within the stipulated month(s) from march to april under the guidance of Prof/Dr Veena Vighneswaran of our(Kerala Agricultural University) institution


Signature
Dr. Veena Vighneswaran Name & Designation
Asst. Professor (PB & C) (Head of the Host Institution)
Rice Research Station
Vyttila, Kochin-682 019


Dr. Veena Vighneswaran
Asst. Professor (PB & C)
Rice Research Station
Vyttila, Kochin-682 019




(Principal/HOD/Institution)
SPECIAL GRADE PRINCIPAL
MAHARAJA'S COLLEGE
ERNAKULAM

Encl:1) Project Report

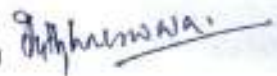
2)Attendance certificate from parent institution(as per notification dated.....)

RICE RESEARCH STATION VYTILO
Under Kerala Agricultural university Thrissur
DEPARTMENT OF PLANT BREEDING

CERTIFICATE

This is to certify that Ms NAVEENA BEDSY ANAND(Admission number 7960) is a second-year M.Sc. Botany student at Maharajas College, Ernakulam. She completed her research work under the ASPIRE fellowship scheme at the Department of Plant Breeding, RICE RESEARCH STATION, UNDER KERALA AGRICULTURAL UNIVERSITY THRISSUR from March 23rd to MAY 15 2023. Her attendance at RICE RESEARCH STATION during this period is above 90%.

Date:

HOD 

Dr. Veena V. Sureswaran
Asst. Prof.
Rice Research Station
Vyttila, Kochin-682 019

| | | | |
|---|-----------------------|---|--|
| 1 | Title of the project | Assay of stress tolerance in <i>Zamioculcas zamiifolia</i> : An ornamental aroid. | |
| 2 | Name | NAVEENA HEDSY ANAND | |
| 3 | Identification number | ASPIRE SCHOLARSHIP 2022-23 | |
| 4 | Affiliation: | a. Parent Institution Maharaja college Ernakulam | b. Host Institution Rice research institution vytila under Agricultural university Trissur |
| 5 | Abstract | <p><i>Zamioculcas zamiifolia</i> is an aroid plant native to Africa and is an indoor plant of great economic demand mainly due to its aesthetic value and also of its low maintenance cost. The plant is tolerant to drought to a long extend and it can be left without watering for more than 3 weeks. Morphological and anatomical peculiarities of the plant made it tolerant to drought. The plant has grown under drought stress under various intervals of time, proline is one of the biochemical indicator of abiotic stress. The concentration of proline on each plant has been determined and it showed a characteristic increase in concentration of proline on increase to stress. From the studies and biochemical analysis done on the plant the tolerance of the plant to abiotic stress such as drought has been determined and the extent to which the plant can survive without watering is also determined. The morphology, anatomy and many physiological adaptations inbuilt within the plant make it tolerant to drought. And more over the best suited watering intervals of the plant also have been standardized.</p> | |
| 6 | Introduction | <p>Plants are distributed to various habitats on the earth and are being encountered by different climatic conditions. Water is one of the most essential factor for the existence of all life forms, including plants. Water should be available in an optimum level for the survival, growth and metabolism of plants. Drought is a condition in which the soil water is insufficient to meet the requirements of the life rely on it. The deficiency of water in the soil for a prolonged period can adversely affect the growth and metabolism of plants and it can be fatal. Due to various climatic and environmental fluctuations and other reasons plants are facing various stress, but also they are having the capacity to modify their morphological, anatomical, physiological and biochemical factors to sustain life and to get adapted to that habitat. During stressed conditions there are various biochemical, physiological, and molecular reactions occurring in plants which make them tolerant for the survival in the adversity. There are different defence mechanisms acting on plants during drought stress, that include the morphological and physiological changes and the accumulation of various biochemical substance such as proline, glycine -betain, glucose etc. Proline is an important stress marker in plants, the concentration of proline in plant can be considered as a parameter for determining the intensity of stress and its tolerance to stress. The accumulation of these soluble chemicals in the cytoplasm will not interfere with normal metabolic activities but make them tolerant to the drought stress by acting as an osmoprotectant and maintaining the osmotic potential and molecular stability of the plant. <i>Zamioculcas zamiifolia</i> is an exotic ornamental indoor plant native to East Africa, belong to the family araceae of monocotyledonae. The genus <i>Zamioculcas</i> is having a single species <i>zamiifolia</i>. It is of high commercial value and are extensively imported to India due to its</p> | |

| | | |
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| | | <p>aesthetic value and the economic importance. <i>Zamioculcas zamiifolia</i> is a small herbaceous plant with ovoid waxy and fleshy leaves and rhizomatous stem, it's morphology itself shows it's tolerance to drought. It is the only CAM plant in araceae(Hottum, Joseph A M et al., 2007).</p> <p>The current study is proposed to determine the factors which contribute to drought tolerance in <i>Zamioculcas zamiifolia</i> and to study the extent to which it can tolerate drought stress. And also for determining tolerance to drought stress using proline as the stress marker.</p> |
| 7 | Methodology: | <p><i>Zamioculcas zamiifolia</i> plants are collected from at Marie's nursery chunnai, Kottayam. 3 plants with approximately same age are selected. The selected plants are properly identified using taxonomic keys in order to conform the genus and species. The morphology of the plant is investigated using stereomicroscope. Anatomy of the plant was studied by taking hand sections of leaf and petiole. And the sections are properly stained using safranin. The plants are subjected to drought of varying degrees of drought stress(3days, 1 week). The biochemical assay of proline has done according to sadashivam manickam.</p> <p>Estimation of proline</p> <ol style="list-style-type: none"> 1.Extract 0.5 ml of plant material by homogenizing in 10 ml 3%aqueous sulfosalicylic acid 2.Filtrate the material through what man No 2 filter paper 3.Take 2 ml of filtrate in a test-tube. add 2 ml glacial acetic acid and 2 ml acid ninhydrin, warm 1.25 ninhydrin in 30 ml glacial acetic acid and 20 ml 6 M phosphoric acid. And store at 4° c.) 4.Heat it in a boiling water bath for 1 hr. 5.Terminate the by placing in ice bath 6.Add 2 ml toluene in the reaction mix for 20-30sec and separate the toluene mixture by warming to room temperature and measure the red colour at 540 nm |
| 8 | Observation and Results: | <p>The plant is having adaptations to tolerate drought for a great extent. Morphologically presence of thick cuticle on the leaf, the plant body is having stem reduced into rhizome. Anatomically the leaf is having stomata only on the lower side and presence of sclerenchyma on the upper side. On the biochemical analysis the amount of proline had exponential increase when the plant is subjected to drought stress. Accumulation of proline in the plant is considered as an indications of stress tolerance</p> |
| 9 | Discussion: | <p>Findings include the plant <i>Zamioculcas zamiifolia</i> is an arid ornamental plant and having morphological anatomical and biochemical adaptations in response to drought stress. The accumulation of proline is an indication of tolerance to abiotic stress. And the plant can survive up to 2 -3 weeks without watering and beyond that time period chances of yellowing of leaves increased. And the best time intervals watering is in between 3-5 days or once in a week. Overwatering of the plant is not advisable. Further studies on the biochemical and molecular parameters that promote tolerance to drought are under process.</p> |
| 10 | Acknowledgements: | <p>With great pleasure I extend my sincere thanks to Dr Veena Vigneshwaran, Associate professor department of plant breeding, Rice Research Institution vyttila for sustained guidance. With all due respect I thank Dr Joy principal maharajas college Ernakulam. Mr.Thomas antony HOD department of botany Maharajas college Ernakulam. I also wish to thank Dr.Krishna Kumar K, department of botany Maharajas college Ernakulam for various helps during course of my study. Also I extend my thanks to non teaching staffs of department of botany Maharajas</p> |

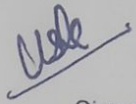
| | | |
|--------|--------------|---|
| | | college and Rice research institution vytila for their timely help. I also thank my family and friends who helped me for the completion of my work. Finally i express my gratitude to DCE for providing necessary funding for the project. |
| 1 1 | Bibliography | <ol style="list-style-type: none"> 1. Jingming, W., & Dansheng, C. (2004). The research on photosynthetic characteristics in leaves of <i>Zamioculcas zamiifolia</i> seedlings. <i>Guangxi Sciences</i>, 11(1), 75-77. 2. Holtum, J. A., Winter, K., Weeks, M. A., & Sexton, T. R. (2007). Crassulacean acid metabolism in the ZZ plant, <i>Zamioculcas zamiifolia</i> (Araceae). <i>American journal of botany</i>, 94(10), 1670-1676. https://doi.org/10.3732/ajb.94.10.1670 3. Carillo Petronia & Gibon Yves(2011) PROTOCOL: Extraction and determination of proline. http://promethewiki.publish.csiro.au/wiki/index.php?page=PROTOCOL%3A+Extraction+and+determination+of+prolin 4. Lum, M. S., Hanafi, M. M., Rafii, Y. M., & Akmar, A. S. N. (2014). Effect of drought stress on growth, proline and antioxidant enzyme activities of upland rice. <i>JAPS: Journal of Animal & Plant Sciences</i>, 24(5). 5. González Sivilla, R., & Méndez Santos, I. (2020). <i>Zamioculcas zamiifolia</i> (Araceae), an African species. 6. Muhammet Cagri Oguz , Murat Aycan ,Oguz Ergu ,Poyraz Irem,Yildiz Mustafa (2022). Drought Stress Tolerance in Plants: Interplay of Molecular, Biochemical and Physiological Responses in Important Development Stages.<i>Physiologia</i>.,2, 180-197. |
| 1 2 | Feed back: | The study was conducted under both field and Laboratory conditions. By doing this project work i was able to familiarize biochemical analysis of plants, and it helped me to attain knowledge in that particular area. My reading habits increased . I need more information about molecular analysis on drought tolerance Due to the shortage of time period my work is not repeated. |

Dr. Vytila
 Head of
 Rice
 Vytila, Kottayam, Kerala

Appendix-II

PROJECT COMPLETION CERTIFICATE
(FOR ASPIRE SCHOLARSHIP - 2022-23)

This is to certify that Sri/Smt..... BLESSY TEREENA DCRUZ..... PG.....student of..... MAHARAJAS COLLEGE,
ERNAKULAM.....affiliated to.....Cochin University of Science and Technology.....has successfully completed his/her
Aspire Scholarship Project/Internship entitled Quantitative Analysis on cartoon Storage in members of palmalee
distributed in subash bare park, ernakulam, Kerala..... within
the stipulated month(s) from 23/03/23 to 14/05/23 under the guidance of Prof/Dr. Usha K Aravind.....of
our(Cochin University of Science and Technology) institution



Signature

Name & Designation

(Head of the Host Institution)

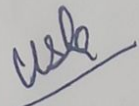


Name & Designation

(Guide of Host Institution)

(Office Seal)

Dr USHA K ARAVIND
Principal
School of Studies
Cochin University of Science and Technology



(Principal/HOD/Institution)

Encl 1) Project Report

2) Attendance certificate from parent institution(as per notification dated.....)

ATTENDANCE STATEMENT

This is to certify that Ms. Blessy Tereena Dacruz (2nd MSc Botany) is a bonafide PG student of Department of Botany, Maharajas College, Ernakulam, has successfully completed her Research Award (2022-23) Project within the stipulated month from 23/03/2023 to 14/05/2023 under the guidance of Dr. Usha K Aravind, Director, School of Environmental Studies, CUSAT, Kochi with an attendance of 100%.



DIRECTOR

School of Environmental Studies

CUSAT, Kochi

Dr. USHA. K. ARAVIND
Professor
School of Environmental Studies
Cochin University of Science & Technology
Kochi-22



പരിസ്ഥിതി പഠന വിദ്യാലയം
SCHOOL OF ENVIRONMENTAL STUDIES
കൊച്ചി ശാസ്ത്ര സാങ്കേതിക സർവ്വകലാശാല
COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY

Director

Date..23/03/2023

SES/2022-23/ 221

Joining Report

Ms.Vahidha Parveen A, (18/57, Thekkegramam Road, Thekkegramam P O ,Chittur, Palakkad, Kerala) has joined in the School of Environmental Studies, Cochin University of Science and Technology, Kochi -22, with effect from 23/03/2023 A.N, for doing the Internship for Aspire Scholarship.

Kochi-22

Date: 23/03/2023




DIRECTOR Cile

DIRECTOR
SCHOOL OF ENVIRONMENTAL STUDIES